



# UNITED STATES PATENT AND TRADEMARK OFFICE



UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,447	02/25/2004	Johannes Adrianus Maria Van Broekhoven	TS-1030 (US) JDA:KNL	4897
23632	7590	09/10/2007		
SHELL OIL COMPANY P O BOX 2463 HOUSTON, TX 772522463			EXAMINER DOUGLAS, JOHN CHRISTOPHER	
			ART UNIT 1764	PAPER NUMBER
			MAIL DATE 09/10/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



UNITED STATES PATENT AND TRADEMARK OFFICE

---

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

MAILED  
SEP 10 2007  
GROUP 1700

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/786,447  
Filing Date: February 25, 2004  
Appellant(s): VAN BROEKHOVEN ET AL.

---

Craig M. Lundell  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 6/22/2007 appealing from the Office action mailed 3/31/2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

WO 99/58480	DIRKZWAGER	11-1999
4,273,735	JACQUES	6-1981

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claim 1 is rejected under 35 U.S.C. 103(a) as obvious over Dirkzwager (WO 99/58480). Dirkzwager discloses a process for the preparation of styrene comprising the dehydration of 1-phenylethanol in the presence of a dehydration catalyst where the catalyst consists of shaped alumina catalyst particles having a surface area (BET) in the range of from 80 to 140 m<sup>2</sup>/g and a pore volume (Hg) in the range of 0.35 to 0.65 ml/g (see Dirkzwager, page 3, lines 16-25 and MPEP § 2144.05 I).

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dirkzwager in view of Jacques (US 4273735). Dirkzwager discloses everything in paragraph 4, but does not disclose where the alumina catalyst is pseudo-boehmite and where the catalyst has a pore volume of from 0.75 to 0.85 ml/g.

However, Jacques discloses an alumina catalyst prepared from boehmite having a pore volume of from 0.3 to 2.8 cm<sup>3</sup>/g (see Jacques, column 4, lines 6-24 and lines 34-44).

Jacques discloses that such a catalyst is used for dehydration and is particularly useful for treating gases (see Jacques, column 5, lines 10-24).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Dirkzwager to include an alumina catalyst prepared from boehmite having a pore volume of from 0.3 to 2.8 cm<sup>3</sup>/g because such a catalyst is used for dehydration and is particularly useful for treating gases.

**(10) Response to Argument**

Appellant first argues (see Brief, page 3) that there is no teaching or suggestion in Dirkzwager to use a catalyst having a pore volume of more than 0.65 ml/g when Dirkzwager discloses that the catalyst has a pore volume in the range of 0.35 to 0.65 ml/g. However, there is no patentably distinct difference between "0.35 to 0.65 ml/g" and "more than 0.65 ml/g". An infinitesimally greater amount of, for example, 0.650001 does not appear to differentiate the present invention from the prior art.

In addition, Appellant argues that superior results were achieved using the catalyst with pore volumes greater than 0.65 ml/g. However, the negative results behind Comparative Example 1 were due to BET because Comparative Example 1 had a pore volume of 0.84 ml/g. Also, Comparative Examples 2 and 3 do not encompass values of the reference's range, which is just below 0.65 ml/g and Comparative Example 2, having a pore volume of much lower than 0.65 ml/g (the pore volume of Comparative Example 2 is 0.57 ml/g), gets good results, which were just over 2 percentage points less than the Examples 1 and 2. In addition, Examples 1 and 2 each have pore volumes that are much greater than 0.65 ml/g (Examples 1 and 2 each have pore volumes of 0.77 ml/g). Therefore, there is no evidence that any noticeable or measurable improvement of conversion would occur at pore volumes just greater than 0.65 ml/g as opposed to pore volumes of 0.65 ml/g.

Appellant also argues (see Brief, page 4) that there is no teaching or suggestion to combine the teachings of Jacques with the teachings of Dirkzwager to arrive at the present invention. However, Jacques is directed to a catalyst that is useful in

Art Unit: 1764

dehydration reactions, which is the reaction of the present invention, and that such a catalyst possesses excellent mechanical characteristics, including porosity (see Jacques, column 4, lines 6-24 and column 5, lines 10-24). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Dirkzwager to include the catalyst of Jacques because such a catalyst is useful for dehydration reactions.

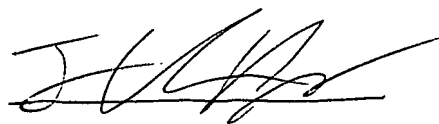
**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

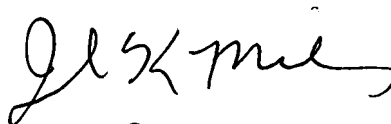
Respectfully submitted,

John C. Douglas  
Examiner  
Art Unit 1764



JCD  
August 28, 2007

Conferees:  
Jennifer K. Michener



QAS, 1700

Glenn Caldarola

